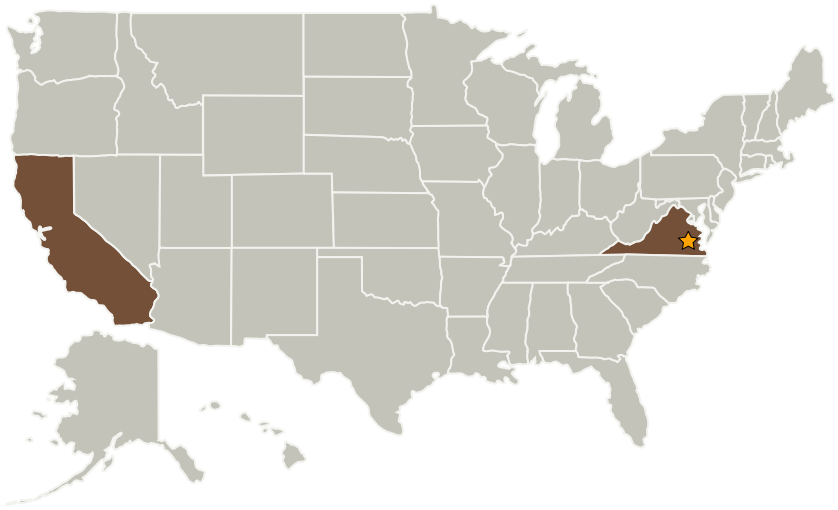
One-Dimensional Tunable Photonic-Crystal IR Filter, Phase I

Completed Technology Project (2006 - 2006)

Project Introduction

MetroLaser proposes to design and develop an innovative narrowband tunable IR filter based on the properties of a one-dimensional photonic crystal structure with a resonant cavity. Such a structure can exhibit an ultra-narrow, high-throughput band in the middle of a wide low-transmission stop-band. During Phase I, we will demonstrate experimentally the proof-of-concept for the proposed filter with sub-angstrom bandpass and a tuning range of at least 10 cm-1 in the spectral region around 10 um. We will complete modeling of the functional characteristics, based on the specific features of photonic crystal structures with a resonant cavity, and develop a strategy for building a prototype of the instrument. Fine-tuning of the filter will be accomplished by varying the optical cavity length. The proposed filter is expected to have an acceptance angle of at least 1 degree and an aperture of about 1 inch. During Phase II, the compact prototype module will be demonstrated with an expected tunability range of 10 cm-1 and a bandpass range of 0.1 cm-1. A compact, rugged, monolithic filter architecture will allow this instrument to be incorporated in air- or space-based platforms and provide stable performance in harsh operating environments.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
MetroLaser, Inc.	Supporting Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Laguna Hills, California

Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.4 Remediation